SHOCKING DEVELOPMENTS:

THE VAPA CPR NEWSLETTER

On the week of May 19th, the hospital accomplished the rollout of a new set of defibrillators to replace the existing Physio Control LP-20s. The Phillips MRx comes from an entirely different manufacturer, and includes a few features that were not present on the prior generation of defibrillators. We do not assume that any experience with the old models implies "training" on the Phillips, however, the seasoned user who knows the basic functions and controls of a defibrillator (i.e. energy selection, charge button, sync button, discharge, and pacing functions) will find the transition easy. This newsletter will describe what is new, where you can acquire additional experience, and a brief review of code team structure and expectations regarding management of cardiac arrest.

Where is the new device?

All crash cares now have the MRx defibrillators. There is a training crash cart and defibrillator accessible at all times in the small IICU conference room (101-2F). The cart is unlocked to allow visualization of its contents (except for drugs which are removed from the demo. cart). The demo. defibrillator as well the wards units are fair game for you to turn on and handle. If you handle the ward's defibrillator, do not use any disposables, and leave the unit in the ready mode when you are done. Likewise, don't open your unit's cart unless there is a true emergency; go to the IICU and look through the demo cart if you want to see what's inside! You may want to print out this sheet and review its features alongside a real device.

What is new?

In accordance with 2010 ACLS guidelines and their underlying evidence, all new generation defibrillators are capable of measuring end tidal CO_2, as well as providing feedback on the quality of chest compressions (CPR feedback). CPR feedback provides information regarding compression rate, depth and adequacy of chest recoil during the upstroke of CPR. On the Phillips, the latter is accomplished by a cell-phone sized device called the "puck." The puck is attached to the defibrillator via a wire, and during arrest, is attached to the center of the chest with a disposable adhesive strip. Chest compressions are applied directly to the puck, which provides three types of information: (1) adequacy of compression rate-- displayed on a speedometer-type dial; (2) depth of compressions – displayed as a "filling in" of a bar-display on the puck, and (3) proper recoil-- displayed as "emptying" of the bar display.

$EtCO_2$ indicates delivery of blood from the right heart to the pulmonary circulation, and is used to indicate adequacy of CPR (you want to have the $EtCO_2 > 20$), as well as verification of proper tube placement through the various patient movements during and after resuscitation. If the $EtCO_2$ is too low, all aspects of resuscitation including rate and adequacy of compressions, tube placement and proper use of drugs need to be reassessed. The end tidal CO_2 measurement device is attached to endotracheal tubes via a straight connector for monitoring in intubated patients. Its use with LMA and facemask ventilation during CPR has not yet been established.

Priorities of resuscitation

Most of our in-hospital arrests are due to progression of medical and post-surgical problems such as hypovolemia, bleeding, electrolyte and metabolic disturbances. There is a strong underlying presence of heart disease in our patients which compromises physiologic reserve, but is NOT the underlying cause of most arrests (in contrast to out-of-hospital arrests where primary coronary obstruction is quite common). For hospitalized patients in arrest, it is absolutely essential that high quality CPR is introduced as early as possible and without any interruption. This can and should occur without the crash cart and any other extra equipment. This is worth pointing out because with the arrival of new technology, it is common to fixate on operational details to the determent of resuscitation quality. When analytic equipment does arrive, establish whether the patient has a shockable arrest or has a non-shockable rhythm such as asystole, bradycardia or "PEA" (pulseless sinus tachycardia, a-fib, etc.). Application of electrodes, pads, and the first look at the monitor must take place without any interruption of compressions. Compressions can cease for a second or two while a backboard is placed and while two quick small breaths are given following each run of 30 chest compressions. Use ventilation breaks to feel for pulses, inspect cardiac rhythms, to attach the CPR feedback device, and to alternate people providing compressions. Count compressions out loud to better coordinate these activities as well as ventilation. The team leader should orchestrate these various movements.

Code team structure and expectations

All pager-carrying code team members have a specific role. Please attend the daily meetings (7:50 AM outside IICU conference room and 10:10 PM outside the MSICU conference room). The purpose of these meetings is for team members to meet one another and review roles, leadership, other capabilities, and priorities. Also take this as an opportunity to discuss unstable patients that should be visited after the meeting. A poster at each of the meeting locations details team members and roles, as well as the points to be covered during the meeting.

Pitfalls, problems, and common questions during an arrest

1. Analyzing rhythm. DO NOT use the AED function despite the fact that you indeed need to analyze the rhythm and there just happens to be an "analyze button." This button commands bystanders to stop CPR (worse thing possible) while it analyzes the rhythm. Think of this button as the "on" button of a paper shredder that is about to eat your medical or nursing diploma. You should not be a medical or nurse code responder if you cannot distinguish between a shockable and non-shockable rhythm.

2. Hands off the chest. Time on the chest performing compressions is associated with improved return of circulation, shock efficiency and arrest survival. Activities that require breaks in compression such as backboard placement, change in chest compressor, ventilation, pulse and rhythm checks should be coordinated to maximize overlap and assure that the only thing that stops compression is breathing. If air is exchanged with

bag-mask ventilation, you should generally not stop compressions to intubate. Intubation can happen during compressions in some cases. You don't have to repeat the "I'm clear . . ." mantra every time you shock. Tell people you are "shocking on 3" make your count; give compressions on counts 1 and 2. Have your thumb on the button as you look over the field. When all is clear, deliver the shock and tell the compressor to resume.

3. What is the O2 saturation? What is the blood pressure? We hear these questions all the time during pulseless arrests. The answer is so clear, I can tell it to you now. No pulse, no ox. No pulse, no BP. The time to check vital signs was hours before the arrest when you might have had a chance to prevent it. Now the key interventions are based on presence of a pulse.

No pulse→ CPR
CPR in progress→ Figure out whether the rhythm is a shockable rhythm or not
Get out your cards→ Page 1 is the shockable side, page 2 is non-shockable
→ Do what the cards say. USE THEM. YOU NEED THIS INFORMATION IN A STRESSFUL CRISIS.

4. Where can I get the official VA CPR cards?? Go to the Anesthesia department, find Sofia's Desk, and there you will find a stack of laminated cards with algorithms and useful phone numbers and other directives.

5. How do I know what is in the crash cart?? There is a demo crash cart in the small IICU conference room (next to the big conference room). Should be open 24/7. Open it up and explore. The time to learn is now, not during an emergency.

6. *What if I think I need additional training??* First off, contact your area manager and peers as they may have answers to specific questions. It is always OK to turn on one of the devices as long as you do not consume disposable supplies and as long as you leave everything in the ready mode. Nurses from the IICU, ED, OR and PACU and MSICU will receive supplemental advanced training in the "shock box" course. Floor nurses, NAs, and LVNs will learn more about the new equipment in the "GO!" course. Other groups can contact Dr. G. Lighthall at ext. 66756 to arrange a session with a Phillips representative.

7. *When do I call a code blue versus eTeam??* Anyone lacking a pulse or respiratory movements should receive a code blue call. Patients in extreme distress who you think won't last another 10-20 minutes should also receive code blue calls. Any other patient you are worried about or that has any of the vital sign criteria listed on the posters on your ward should receive eTeam calls. Patients with persistently low urine output, dropping blood pressures, suspected strokes or sepsis—even if not displaying the vital sign criteria –should receive eTeam calls. Please call the primary team when you call the eTeam.

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